

# PATENT SPECIFICATION

685.987



Date of Application and filing Complete Specification Oct. 29, 1951.

No. 25230/51.

Application made in United States of America on Oct. 31, 1950.

Complete Specification Published Jan. 14, 1953.

Index at acceptance :—Class 28(ii), L4.

## COMPLETE SPECIFICATION

### Improvements in and relating to Juice Extractors

We, THE BRITISH THOMSON-HOUSTON COMPANY LIMITED, a British Company, having its registered office at Crown House, Aldwych, London, W.C.2, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to juice extractors, and more particularly to a juice extracting attachment for a household food mixer, or other suitable source of mechanical power.

15 When juice is extracted from oranges, lemons, or similar fruits, by use of a high speed rotating reamer, it is desirable to provide a strainer to separate the juices from the seeds and pulp in addition to providing an arrangement for collecting and discharging the juices. Electric food mixers of the type commonly sold for household use frequently include such a juice extracting attachment, with the reamer driven by the mixer power unit and a suitable juice collecting and discharge bowl carried by the power unit. With such juice extracting attachments, and in other types of juice extractors, it has been common practice to include a stationary screen or strainer to separate the desired juices from the undesirable pulp and seeds. However, with a stationary strainer, it is found that the small apertures become plugged rather quickly necessitating scraping or removal of the screen for cleaning before continuing operation. Efforts have been made to eliminate this difficulty by including a screen which rotates with the reamer. However, this is found to be unsatisfactory since the centrifugal force impacts the pulp and seeds over the strainer apertures preventing further flow of the desired juices.

It is, therefore, an object of our invention to eliminate the above mentioned difficulties by providing a strainer which is vibrated with a transitory movement

during operation of the reamer. With this construction, a relatively large amount of pulp and seeds will not block the straining apertures. Furthermore, such an arrangement results in a more complete separation of the juice from the waste.

Another object of our invention is to provide in conjunction with a juice extractor assembly a strainer bowl which also has upstanding walls to confine the pulp upon separation from the fruit.

A further object of our invention is to construct a juice extractor attachment for a mixer at reduced manufacturing cost through the maximum use of components capable of being moulded from plastic compounds.

Still another object of our invention is to construct a juice extractor assembly in a simplified form, particularly adapted for attachment to a household mixer, with a minimum number of parts arranged to facilitate assembly, cleaning, and dismantling.

In accomplishment of the foregoing objectives, a feature of our invention consists in the use of a juice extractor attachment for a household mixer comprising three components, which are the reamer and shaft, the juice strainer bowl and the juice collecting and discharge bowl. The above objectives are carried out through the use of an eccentric on the reamer shaft cooperating with the strainer bowl to cause it to vibrate with a transitory motion upon rotation of the reamer. It is through this feature of the invention that the strainer apertures are continually scoured by the seeds and pulp to keep them free and clear for passage of juice. In accordance with a preferred embodiment of our invention, the same juice straining bowl confines substances reamed from the fruit, thus directing the juices into the juice discharge and collecting bowl.

Our invention itself, however, both as to its organization and method of opera-

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tion, together with further objects, advantages and features thereof, may best be understood by reference to the following description taken in connection with the accompanying drawings, in which Fig. 1 is a side elevation of an electric mixer and juice extractor attachment in accordance with one embodiment of our invention; Fig. 2 is a cross-sectional view taken on the line 2—2 of Fig. 1. Fig. 3 is a top plan view of the juice extractor shown by Fig. 1; Fig. 4 is a cross-sectional view, similar to Fig. 2, of another embodiment of our invention. Fig. 5 is a cross-sectional view of a modified form of our invention, and Fig. 6 is a sectional view taken on the line 6—6 of Fig. 5.

While the juice extractor assembly in accordance with our invention may be used with any type of power unit, or may include its own power unit, a preferred embodiment has been illustrated in Fig. 1 in which the juice extractor is in the form of an attachment for a household electric mixer of a more or less conventional type having a base or supporting stand 1 upon which is mounted a power unit 2 controlled by a speed selecting knob 3. The power unit is here shown in an inverted position to receive the juice extractor assembly; whereas for normal mixing operations, handle 4 of the power unit would be upright and suitable beating elements would be employed depending from the power unit for operation in any suitable receptacle which might be placed upon turntable 5.

As may be seen more readily from a reference to Fig. 2, the juice extractor assembly consists of three components, namely, the reamer 6 including its shaft 7, the juice straining bowl 8, and the juice collecting and discharge means 9. Thus, with this simplified arrangement, assembly, dismantling, and cleaning are greatly simplified.

It is to be understood, of course, that power unit 2 includes a suitable driving spindle for engagement with reamer shaft 7. As is common for such a removable driving connection, shaft 7 may be formed with protuberances 10 pinched from the stock of the shaft for the driving connection between the power unit spindle and the shaft. Therefore, whenever the power unit is operating, shaft 7 is rotated at the selected speed. Reamer 6 may be of any suitable size for separation of the juices from fruits such as oranges and lemons. As here shown, it is of a conical shape and includes on its outer surface a plurality of flutes 11, such as shown in Fig. 3. Hence, when a previously halved orange is engaged and

pressed against reamer 6 while it is rotating, the projecting flutes separate the juice, pulp, and seeds from the skin or rind of the orange or other fruit. The reamer, of course, is mounted coaxially with shaft 7.

The juices extracted must, of course, be collected and discharged from a suitable spout. For this purpose, we provide the juice collecting bowl 9 having upstanding peripheral walls 12 and an inner upstanding wall 13 defining a hub portion through which shaft 7 extends. This construction results in a recessed annular area 14 into which the juice flows for discharge from a spout 15. Any suitable receptacle may be placed under the spout for collection of the juices. As shown in this embodiment in which the juice extractor is used as an attachment for a mixer, we provide bosses 16 and 16a for attachment of the juice bowl onto power unit 2. In addition, a wedge-shaped base portion 17 may be formed integrally with collecting bowl 9 to provide a slope tending to direct the juice toward the discharge spout 15.

It is obviously highly desirable to completely separate coarse fibres and pulp along with the fruit seeds from the juices discharged from spout 15. Therefore, in accordance with our invention, the juice straining bowl 8 is interposed between reamer 6 and the juice collecting area 14. As shown most clearly in Fig. 2, juice collecting bowl 8 is formed with a raised central hub portion 18 and an outer upstanding wall 19. Between the outer wall and the hub portion is a depressed annular recess 20, the bottom wall of which is perforated by a plurality of apertures 21. Intermediate the upper and lower ends of outer wall 19 is a lateral shoulder 22. With this arrangement, the juice collecting bowl is closely supported upon the central wall 13 and outer wall 12 of discharge bowl 9. If desired, and as shown in Fig. 2, bowl 8 normally is supported on the upstanding central wall or hub portion 13 of the juice collecting bowl. The position of lateral shoulder 22 with respect to the outer peripheral wall 12 prevents substantial tipping or rocking movement of the upper juice straining bowl 8 with respect to the lower collecting bowl. It should also be noted at this point that the upstanding wall 19 of the juice straining bowl extends upwardly above the top of reamer 6. Thus, this wall confines the juices and pulp thrown outwardly by the high speed rotation of reamer 6, directing the substances extracted into the annular straining area 20.

Experience has shown that the strain-

ing apertures quickly become inoperative after juicing of one or two fruit halves due to clogging of the apertures by the pulp and seeds. To rectify this inadequacy, we attach to the upper end of shaft 7 an eccentric sleeve 23. As shown in Fig. 2, sleeve 23 extends upwardly and is attached at its upper end to reamer 6. However, this attachment is arranged so that the reamer exterior is coaxial with shaft 7. Attached to hub portion 18 of the juice straining bowl 8 is a bearing sleeve 24 in which eccentric 23 is rotatable. Hence, upon rotation of shaft 7, along with eccentric 23 and reamer 6, a lateral motion of the entire juice strainer bowl results. Preferably, juice strainer bowl 8 is prevented from rotation with respect to collecting bowl 9 by the inclusion of interengaging ribs 25a on the internal surface of wall 12 of the lower bowl and the external surface of the outer wall of the upper bowl. However, these ribs do not restrain in any way the lateral motion of the strainer, but prevent only relative rotation. With this arrangement, it may be seen that the upper bowl moves laterally in a circular motion, and upon high speed operation of the reamer, this lateral motion is sufficient to cause a continual scouring action of the pulp and seeds across strainer apertures 21. This scouring action in turn prevents blocking of the apertures and aids materially in separation of the desirable juices from the waste material.

A modified form of our invention, as illustrated by Fig. 4, includes a juice collecting and discharge bowl 25 having a generally frusto-conical configuration. Bosses 26 and 27 permit attachment to a mixer power unit in a manner as described above. The upstanding frusto-conical wall 28 of the juice collecting bowl is joined in a continuous surface with a wall 29 defining a discharge spout 30, which discharge spout extends radially outwardly from the frusto-conical wall 28. The juice collecting bowl also includes a hub portion 31 defined by an upstanding cylindrical wall, thus defining the juice receiving annulus 32.

A suitable fluted reamer 33, generally of the type described above, is affixed to the upper end of a drive shaft 34. Here again, the drive shaft is adapted for driving engagement with a spindle (not shown) of a power unit. While reamer 33 is mounted coaxially with shaft 34, its hub portion 35 is moulded with an outer surface eccentric to shaft 34.

A juice strainer 36, in this instance, is in the form of a shallow circular pan, having its lower or bottom surface perforated as at 37, the size of the perfora-

tions being suitably selected to separate the desirable juices from the pulp and seeds. Formed integrally with this juice strainer is an upstanding handle 38 extending radially outwardly beyond the circular outline of the strainer proper. Thus handle 38 serves not only as a convenient means for grasping the strainer for removal or insertion, but also as a means for preventing rotation of the strainer relative to the juice collecting bowl 25. As shown in Fig. 4, handle portion 38 is oriented in the space defined by the outwardly extending curved walls of the juice discharge spout. The juice strainer also is provided with a hub defined by an upstanding bearing sleeve 39 and a lateral bearing plate 40 resting on the upstanding cylindrical wall 31 of the juice collecting bowl. Bearing plate 40 is apertured for passage of shaft 34.

In operation, the embodiment illustrated by Fig. 4 is similar to the embodiment described above. Rotation of reamer 33 and shaft 34, through the eccentric hub 35 on the reamer, causes a lateral transitory movement of strainer 36. The resultant scouring action of the pulp and seeds over the apertures 37 in the strainer prevents clogging of the apertures and materially aids in complete separation of the juice from the undesired substances.

In Figs. 5 and 6, we have shown an embodiment similar to Fig. 2. However, the components have been modified to further reduce manufacturing costs without impairment of the above described functions.

Referring to Fig. 5, a juice collecting and discharge bowl 41, arranged to be supported on a mixer power unit, includes inner and outer upstanding walls 42 and 43, respectively, to define a juice receiving area 44. Inner wall 42 includes an inwardly directed flange 45, which is apertured to receive a shaft 46 carrying a reamer 47. Shaft 46 is connected, by a press fit, to a spindle 48 adapted to be driven by the mixer power unit.

In this embodiment, reamer 47 may be moulded directly on to shaft 46. Moulded as an integral part of the reamer is an eccentric portion 49, as shown in plan by Fig. 6. The juice straining bowl 50, in this instance, may be moulded in one piece with a hub portion 51 encircling both shaft 46 and eccentric 49. The hub portion 51, along with the upstanding outer walls, directs the extracted products to the bottom perforated wall 52. With this embodiment, the juice straining bowl merely rests on the inner lateral flange 45 and the upper end of the upstanding wall 43 of the collecting bowl. This construction permits a lateral

transitory motion of the straining bowl with respect to the collecting bowl as an aid in separating juices from the undesirable pulp. It is found that the frictional engagement between the two bowls is sufficient to prevent appreciable rotation of the upper straining bowl, without materially restraining the lateral transitory movement of the straining bowl resulting from its cooperating eccentric drive through portion 49 upon rotation of the reamer.

From the foregoing description, it may be seen that we have provided an improved and simplified juice extractor in which the juice straining means is continuously reciprocated in a circular motion to provide a complete separation of juices from pulp, with the problem of clogging of the straining apertures eliminated. As may be readily seen, each of the components of this juice extractor assembly can be moulded from plastic, glass, or like material, with the exception of the reamer drive shaft, which preferably is of metal. The eccentric drive of the juice strainer may be provided by an eccentric formed on the reamer drive shaft or moulded as an integral component of the reamer hub.

While the present invention has been described by reference to particular embodiments thereof, it will be understood that numerous modifications may be made by those skilled in the art without actually departing from the invention.

What we claim is:—

1. A juice extractor comprising a power unit, a juice collecting bowl including juice discharge means carried on the power unit, a strainer bowl loosely supported on said collecting bowl for lateral movement with respect thereto, a reamer including a shaft rotatably driven by the power unit, the collecting bowl having a central aperture through which the shaft extends, and an eccentric on a portion of the shaft, the strainer bowl having a central aperture for receiving the eccentric portion, whereby rotation of the reamer by the power unit reciprocates the strainer bowl.

2. A juice extractor as claimed in claim 1 having means for preventing rotation of the strainer bowl with respect to the collecting bowl, so that rotation of the reamer by the power unit moves the strainer bowl with a lateral transitory motion.

3. A juice extractor attachment for use with a household mixer having a power unit comprising a juice collecting bowl defined by inner and outer upstanding

walls and a bottom wall, the inner walls forming a hub, means on the bottom wall for attaching the bowl to the power unit, spout means for discharging juice collected in the bowl, a juice strainer bowl loosely supported for lateral motion on the collecting bowl, the strainer bowl having a perforated lower surface for juices straining and upstanding walls to confine the extracted products, a hub sleeve affixed to the strainer bowl, a reamer including a drive shaft adapted to be engaged for rotation by the power unit, the drive shaft extending upwardly through the hub of the collecting bowl and being rotatable with respect thereto, an eccentric portion on the shaft and reamer rotatably positioned within the hub sleeve of the strainer bowl, and means to prevent relative rotation between the strainer bowl and collecting bowl, whereby rotation of the reamer results in lateral reciprocation of the strainer bowl.

4. A juice extractor comprising a power unit, a juice collecting bowl defined by a bottom annular wall and a frusto-conical upstanding wall joined in a continuous surface with a wall defining a discharge spout displaced radially outwardly from the frusto-conical walls, an annular juice strainer having a perforated lower surface adapted to be positioned within the collecting bowl and movable laterally with respect thereto, the strainer including an upstanding handle portion positioned within the space defined by the spout wall, a reamer including a drive shaft adapted to be rotated by the power unit, the reamer and drive shaft including an eccentric portion, a hub on the strainer rotatably associated with the eccentric portion, whereby rotation of the reamer laterally reciprocates the strainer with respect to the collecting bowl.

5. A juice extractor comprising a power unit, juice collecting and discharge means, a drive shaft adapted to be rotated by said power unit, a reamer affixed to said drive shaft, an eccentric on said drive shaft, and a juice strainer having a hub portion operatively associated with said eccentric, whereby rotation of said reamer and drive shaft laterally vibrates said strainer.

6. A juice extractor constructed and operating substantially as hereinbefore described with reference to the accompanying drawings.

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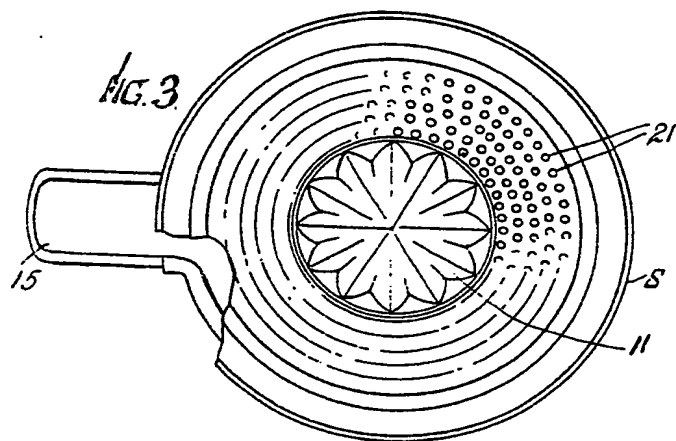
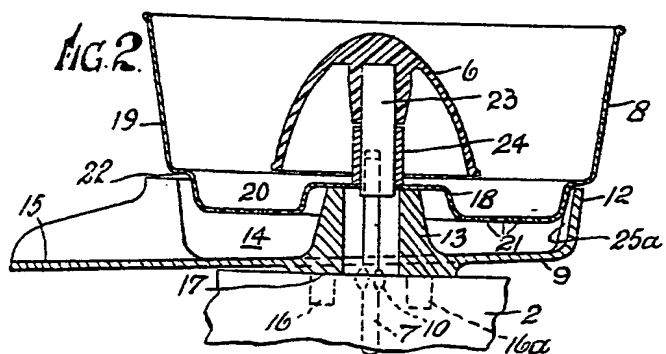
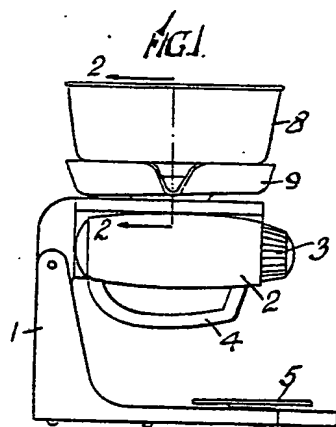


FIG. 4.

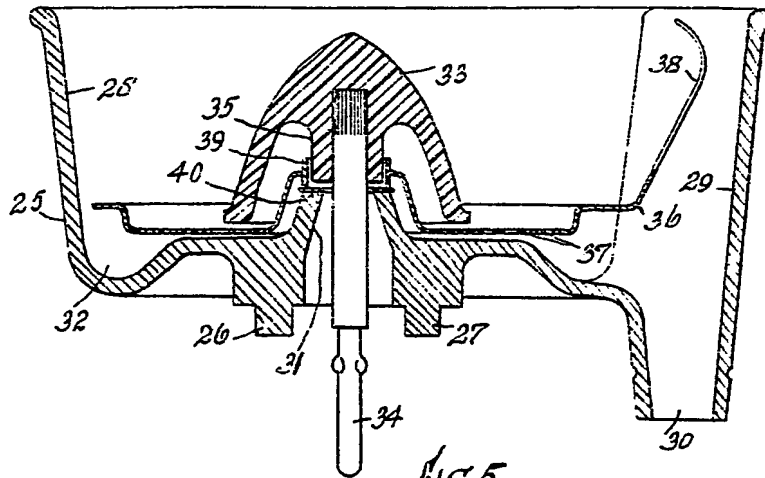


FIG. 5.

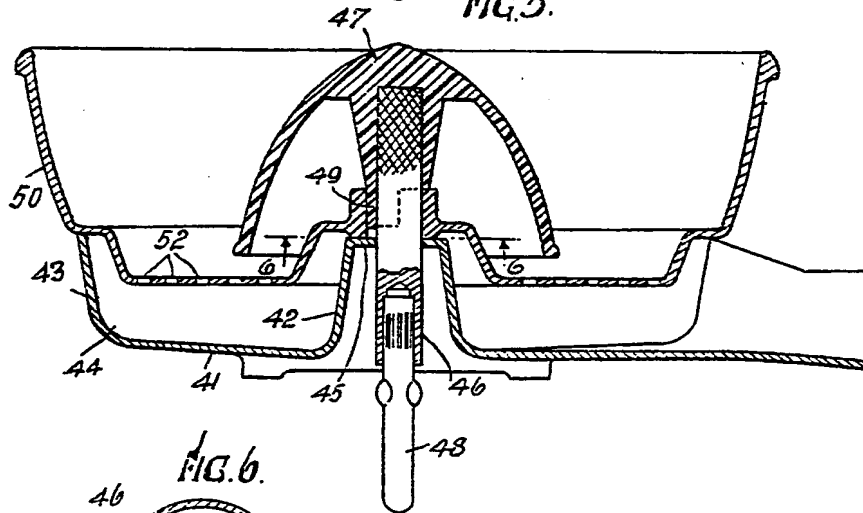
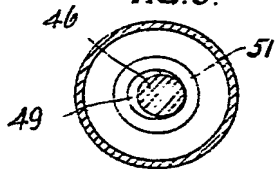


FIG. 6.



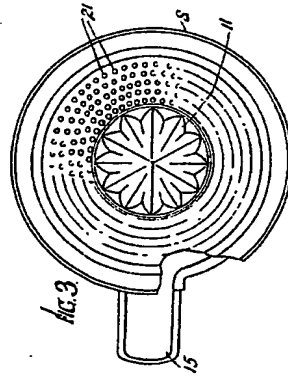
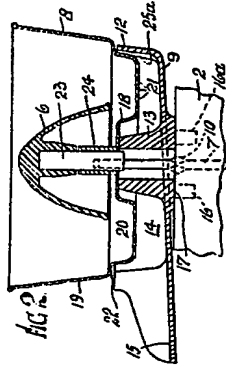
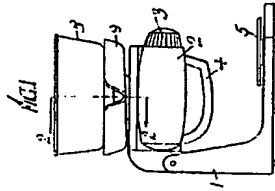


Fig. 4.

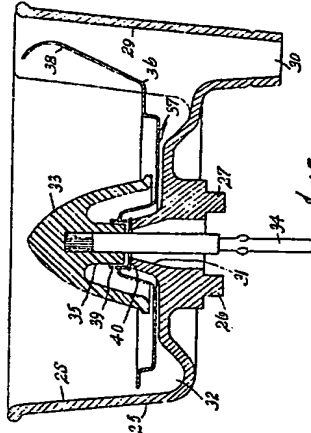


Fig. 5.

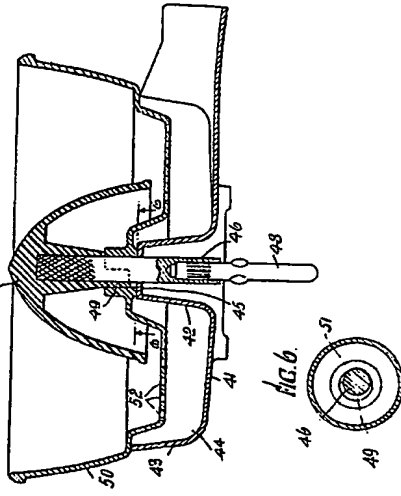


Fig. 6.



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